

Claims

1. A torque transducer comprising:
  - a shaft subject to torque about a longitudinal axis;
  - a transducer element integral with or carried by the shaft and
  - 5 remanently magnetised to emanate a component of magnetic field that is dependent on torque applied about said axis,
  - a sensor coil disposed about said element to generate a voltage/current in response to changes in said component,
  - a load connected to said sensor coil to enable a current to circulate in
  - 10 the sensor coil; and
  - a receiver unit remote from said coil and responsive to a field emanated by said sensor coil to generate a torque-dependent signal.
2. A torque transducer as claimed in Claim 1 in which said receiver unit comprises a coil, preferably wound on a magnetic core.
- 15 3. A torque transducer as claimed in Claim 1 in which the receiver unit coil is wound on a ferrite core.
4. A torque transducer as claimed in Claim 1, 2 or 3 in which said load comprises a capacitor connected across said sensor coil to enhance a field component emanated thereby.
- 20 5. A torque transducer as claimed in any preceding claim in which said transducer element comprises a region integral with said shaft and remanently magnetised with an annulus of longitudinal magnetisation (axially-directed magnetisation) which exhibits profile shift, and said sensor coil comprises two spaced coil sections which are aligned with respective

response maxima and are connected such that the voltages induced therein are summed.

6. A torque transducer system comprises a torque transducer which is as claimed in any one of Claims 1 to 5, and wherein said shaft is coupled to or is  
5 a part of a source of a torque pulse, such as a power torque tool.

7. A torque transducer assembly comprising:

a housing having an opening therethrough;

a torque transmission shaft extending in said opening and rotatable about an axis extending through said opening, said shaft having respective  
10 end portions accessible from exteriorly of said housing,

a torque transducer element integral with, or carried by, said shaft to emanate a magnetic field dependent on the torque in the shaft,

a coil coaxial with said element and adjacent thereto; and for sensing the torque-dependent field,

15 a load, preferably a capacitive load, connected across the coil to enable current to circulate therethrough for emanating a field externally of the assembly that is dependent on changes in torque in the shaft.

8. A torque transducer assembly as claimed in Claim 7 in which one end portion of said shaft projects exteriorly of said housing and provides an output  
20 portion of the shaft.

9. A torque transducer assembly as claimed in Claim 7 or 8 in which said housing is configured to enable it to be secured against rotation.

10. A torque transducer assembly as claimed in Claim 9 further comprising a member having a first portion engaged with the housing and second portion

engageable with the body of a power torque tool to secure the housing against rotation with respect to said body.

11. A torque transducer comprising:

a shaft subject to torque about a longitudinal axis;

5 a transducer element integral with or carried by the shaft and remanently magnetised to emanate a component of magnetic field that is dependent on torque applied about said axis,

a sensor coil disposed about said element to generate a voltage/current in response to changes in said component,

10 a power supply unit comprising a rectifier arrangement connected to said sensor coil to derive a unipolar electrical supply from changes of torque sensed by said sensor coil; and

signalling means responsive to voltage/current signals in said sensor coil to transmit the signals in a wire-less manner for remote detection, said

15 signalling means being powered by said electrical supply.

12. A torque transducer as claimed in Claim 11 in which said transducer element comprises a region integral with said shaft and remanently magnetised with an annulus of longitudinal magnetisation (axially-directed magnetisation) which exhibits profile shift, and said sensor coil comprises two  
20 spaced coil sections which are aligned with respective response maxima and are connected such that the voltages induced therein are summed.

13. A torque transducer comprising:

a shaft subject to torque about a longitudinal axis;

a transducer element integral with or carried by the shaft and remanently magnetised to emanate a component of magnetic field that is dependent on torque applied about said axis,

5 a sensor coil disposed about said element to generate a voltage/current in response to changes in said component,

a power supply unit comprising a rectifier arrangement connected to said sensor coil to derive a unipolar electrical supply from changes of torque sensed by said sensor coil;

10 a sensor arrangement responsive to said torque-dependent magnetic field component to provide a torque-dependent signal; and

signalling means responsive to a torque-dependent signal to transmit the signal in a wire-less manner for remote detection, said signalling means and, if appropriate, said sensor arrangement being powered by said electrical supply.

15 14. A torque transducer system comprises a torque transducer which is as claimed in Claim 11, 12 or 13, and wherein said shaft is coupled to or is a part of a source of a torque pulse, such as a power torque tool.